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(56) Documents cited  
**GB 1575495 A** **GB 1556794 A** **EP 0030909 A2**  
**WO 87/02723 A1**

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## (54) Gangway

(57) A gangway system for transferring personnel and/or cargo or equipment between a ship and an oil platform comprises an elongate articulated structure to span between the vessel and the platform. A pedestal 4 is provided mounting the structure at an inner end for hinge-like movement relative to the ship about a generally horizontal axis. The pedestal permits the structure to be swivelled, relative to the site, about a generally vertical axis. The structure has at least two parts (12, 14) connected one to another for hinge-like relative movement about a generally horizontal axis or axes. Means 22 is provided at an outer end of the structure for coupling it to the platform while permitting universal movement therebetween, for example using an electromagnet 20.

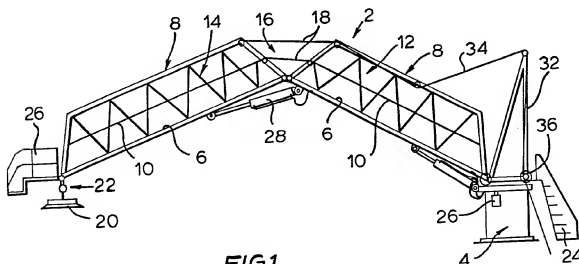


FIG.1

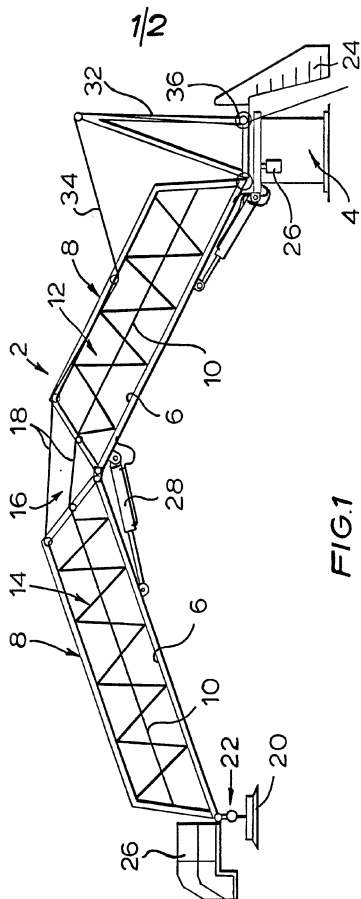


FIG. 1

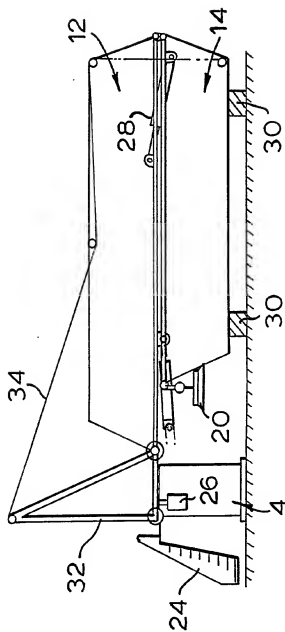


FIG. 2

GANGWAY

This invention relates to gangways.

The background of the invention will be explained in relation to the problems of transfer from a supply ship to an off shore oil platform. The invention is  
5 not limited to this application, however, and other uses will doubtless occur to the reader some, perhaps, outside the environment of shipping.

For maintenance and other necessary purposes, personnel are transferred by helicopter to those off  
10 shore oil platforms which are not normally manned. In order to reduce the costs of working on such platforms it would be desirable to transfer personnel from a supply ship. Conventional gangways, which may be telescopic or fixed in length, are unsuitable for  
15 transfers in seas of any significant size due to the relative motion between the vessel and the platform. For example there have been proposals to use a gangway fixed to the vessel at an inner end. In use it would drop down onto the platform at the outer end which  
20 would not be attached to the platform in order to accommodate the movement between the vessel and the platform. Even when the ship's position is controlled by a dynamic positioning system, there will remain a degree of horizontal movement of the ship relative to  
25 the platform so that the outer end of the gangway will move around correspondingly, perhaps through a 2 meter

diameter circle. In, say, force 6 strength winds, there is an accompanying relative vertical movement of the vessel up to, say, 5 meters. If the end of the conventional gangway stays in contact with the platform, the vertical movement of the ship would produce a horizontal movement of the gangway on the platform and this would be added to the movement produced by horizontal movement of the ship which, in total would be dangerous and generally unsatisfactory.

10       Against this background, the a first aspect of invention provides a gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one on a ship and an the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical structure; the structure having at least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while permitting universal movement

therebetween.

The gangway can accommodate all degrees of relative movement between a ship and an oil platform, i.e. surge, sway, yaw, pitch and roll, while both ends are attached to fixed points, one on the vessel and one on the platform. On the vessel, the gangway may swivel and the spanning structure may incline more or less to the horizontal as the vessel moves relative to the platform, but its inner end stays in one place. On the platform, the gangway may swivel and incline similarly to these movements on the ship and to these movements there is added pitching movement. However, the outer end, again, remains in one place. It is proposed that the gangway may be used to connect a ship to an off shore oil platform for extended periods so that personnel can have living quarters on the ship whilst working on the rig. At such times personnel would have an immediate escape route to the ship in case of emergency.

Although the gangway could be extended manually and indeed, there may be a manually operated system for use as a back up, it preferably includes actuators and/or motors for positioning the structure relative to the first site about both axes and for positioning the parts of the structure relative to one another, and means for rendering the actuators and/or motors inactive once the structure is connected to the second

site so as to accommodate said limited movement.

Thus if the actuators and/ or motors are hydraulic, for example, valves must be provided to allow relative movement once the gangway is connected  
5 or movement of the ship, say, relative to the platform will cause damage.

In a preferred form, the mounting comprises a pedestal rotatably mounted on said one site to permit the structure to be swivelled, the pedestal containing  
10 means to power the actuators and/or motors and a motor and/or actuator to swivel the structure.

Preferably, the gangway has a hydraulic motor for swivelling the structure and hydraulic actuators for positioning structure relative to the first site about  
15 the generally horizontal axis and for positioning the parts of the structure relative to one another, and the pedestal contains a hydraulic power pack arranged to drive the motor and actuators.

Most preferably, the means for coupling the  
20 structure to the second site includes an electromagnet mounted at the outer end of the structure by a universal joint and operable from the first site.

Although it is preferred that the universal movement is provided at the platform end of the  
25 gangway, it is possible for it to be provided elsewhere especially if the structure is suspended from, say a crane.

In accordance with a second aspect, the invention therefore extends to a gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting at least hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical structure; the structure having at least two parts connected one to another for at least hinge-like relative movement about a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while permitting at least hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, at least one of the mounting means connecting means and coupling means permitting universal movement.

One embodiment of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a side elevation of a gangway



embodying the invention, extended for attachment to an oil platform; and

Figure 2 is a side elevation of the gangway when stowed.

5 Referring to the drawings, the gangway comprises and elongate articulated structure which is mounted at one end on a pedestal 4 on the deck of a supply ship. The structure provides a non-slip walkway 6 enclosed by an aluminium box girder framework 8 incorporating  
10 handrails 10, lighting and emergency backup lighting (not shown).

The structure which provides a bridge between the ship and an oil platform, or between two vessels, is in two parts 12 and 14 connected by pins (not shown)  
15 approximately in the middle of the span, to allow hinge-like movement between the two parts about a generally horizontal axis. The frames 8 of the two parts 12 and 14 are linked across a gap 16, necessary to accommodate movement between the parts, by steel  
20 wires 16 held in tension by means not shown.

At its inner end the structure is mounted on the pedestal 4 by pins which allow hinge-like movement about a generally horizontal axis. The pedestal 4 itself is rotatable about a generally vertical axis, so  
25 that the whole structure can swivel about the vertical axis with the pedestal.

An electromagnet 20, supplied with electricity

from the ship, is mounted at the outer end of the structure by a ball and socket universal joint 22.

In use the bridge extends between the ship and the platform to which it is secured by the electromagnet  
5 20. Although the ship may be maintained on station by a dynamic positioning system, there will be some relative movement between the ship and the platform. For example in wind strength of, say, force 6, there may be vertical movement of about 5 metres and  
10 horizontal movement constrained to a 2 metre diameter circle. The gangway will accommodate all degrees movement of the ship relative to the platform, namely surge, sway, yaw, pitch and roll, while both ends are attached one by the pedestal to the vessel and one by  
15 the electromagnet to the platform. Pitching, in particular, of the vessel is accommodated by the universal joint 22.

A ladder 24 may be provided for convenient access over the pedestal to the walkway. A platform 26 is  
20 pivotally mounted at the outer end of the structure and may be adjusted generally horizontal facilitate stepping off onto the platform.

In order to position the structure between the vessel and the platform, the pedestal 4 contains a  
25 hydraulic power pack to drive a hydraulic motor 26 for swivelling the pedestal and hydraulic rams 28 for adjusting the inclination of the parts 12 and 14 of the

structure. The electromagnet 20 and the hydraulics can all be controlled from the vessel's bridge or from the pedestal.

As the electromagnet is activated hydraulic valves  
5 are operated to permit each of the hydraulic actuators 28 and motor 26 to move, relatively freely, in order to allow the movement of the parts relative to each other and the pedestal, which movement is necessary in order to accommodate the movement of the vessel  
10 relative to the platform.

In order to stow the gangway, the electromagnet is de-activated and the hydraulics are activated so that the rams lift the end of the structure clear of the platform. The outer part 14 is folded under the  
15 inner part 12 and the pedestal 26 is swivelled so that the structure lies over a cradle shown in section at 30 onto which it is lowered as shown in Figure 2.

A pylon 32 is mounted on the pedestal 4 to support an emergency operating cable 34. The cable is  
20 controlled by a winch 36 which may be operated manually or by an electrical motor (not shown) powered by the ship's emergency supply. The end of the cable 34 is attached to the outer part 14 of the structure so that operating the winch 36 will initially lift the part 14  
25 from a position hanging more or less vertical from the end of the part 12, to a position folded against a stop beneath the part 12. The pedestal is then

swivelled to position the structure over its cradle.  
and the winch is reversed to lower the structure onto  
its cradle.

CLAIMS

1. A gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one on a ship and an the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical structure; the structure having at least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while permitting universal movement therebetween.

2. A gangway as claimed in claim 1, including actuators and/or motors for positioning the structure relative to the first site about both axes and for positioning the parts of the structure relative to one another, and means for rendering the actuators and/or motors inactive once the structure is connected to the second site so as to allow said limited movement.

3. A gangway as claimed in claim 2, wherein the mounting comprises a pedestal rotatably mounted on

said one site to permit the structure to be swivelled, the pedestal containing means to power the actuators and/or motors and a motor and/or actuator to swivel the structure.

5           4.       A gangway as claimed in claim 3, including a hydraulic motor for swivelling the structure, hydraulic actuators for positioning the structure relative to the first site about the generally horizontal axis and for positioning the parts of the  
10 structure relative to one another, and wherein the pedestal contains a hydraulic power pack arranged to drive the motor and actuators

          5.       A gangway as claimed in any preceding claim, wherein the means for coupling the structure to  
15 the second site includes an electromagnet mounted at the outer end of the structure by a universal joint and operable from the first site.

          6.       A gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one  
20 on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first  
25 one of the sites, said mounting means permitting at least hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and

permitting the structure to be swivelled, relative to the site, about a generally vertical structure; the structure having at least two parts connected one to another for at least hinge-like relative movement about  
5 a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while at least permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be  
10 swivelled, relative to the site, at least one of the mounting means connecting means and coupling means permitting universal movement.

Amendments to the claims  
have been filed as follows

1. A gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical axis; the structure having at least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while permitting universal movement therebetween.

2. A gangway as claimed in claim 1, including actuators and/or motors for positioning the structure relative to the first site about both axes and for positioning the parts of the structure relative to one another, and means for rendering the actuators and/or motors inactive once the structure is connected to the second site so as to allow said limited movement.

3. A gangway as claimed in claim 2, wherein the mounting comprises a pedestal rotatably mounted on



permitting the structure to be swivelled, relative to the site, about a generally vertical structure; the structure having at least two parts connected one to another for at least hinge-like relative movement about  
5 a generally horizontal axis or axes; and means at an outer end of the structure for coupling it to the other site while at least permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be  
10 swivelled, relative to the site, at least one of the mounting means connecting means and coupling means permitting universal movement.

7. A gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one  
15 on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first  
20 one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical axis; the structure having at  
25 least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; means at an outer end of the structure for

coupling it to the other site while permitting universal movement therebetween; actuators and/or motors for positioning the structure relative to the first site about both axes and for positioning the parts of the structure relative to one another; and means for rendering the actuators and/or motors inactive once the structure is connected to the second site so as to allow said limited movement.

8. A gangway system for transferring personnel and/or cargo or equipment between two sites (e.g. one on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical axis; the structure having at least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; and an electromagnet mounted at the outer end of the structure by a universal joint and operable from the first site, for coupling the structure to the second site.

9. A gangway system for transferring personnel

and/or cargo or equipment between two sites (e.g. one on a ship and the other on an oil platform) when there is limited movement between the sites, the system comprising: an elongate articulated structure for spanning between the two sites; mounting means at an inner end of the structure for mounting it on a first one of the sites, said mounting means permitting hinge-like movement of the structure, relative to the site, about a generally horizontal axis, and permitting the structure to be swivelled, relative to the site, about a generally vertical axis; the structure having at least two parts connected one to another for hinge-like relative movement about a generally horizontal axis or axes; means at an outer end of the structure for coupling it to the other site while permitting universal movement therebetween; actuators and/or motors for positioning the structure relative to the first site about both axes and for positioning the parts of the structure relative to one another; and means operable to allow movement of the parts relative to each other and the first site in order to accommodate the movement between the sites.